

B. C. STICKNEY.
TYPE WRITING MACHINE.
APPLICATION FILED APR. 9, 1903.

Patented Nov. 8, 1910.

2 SHEETS-SHEET 1.

974,841.

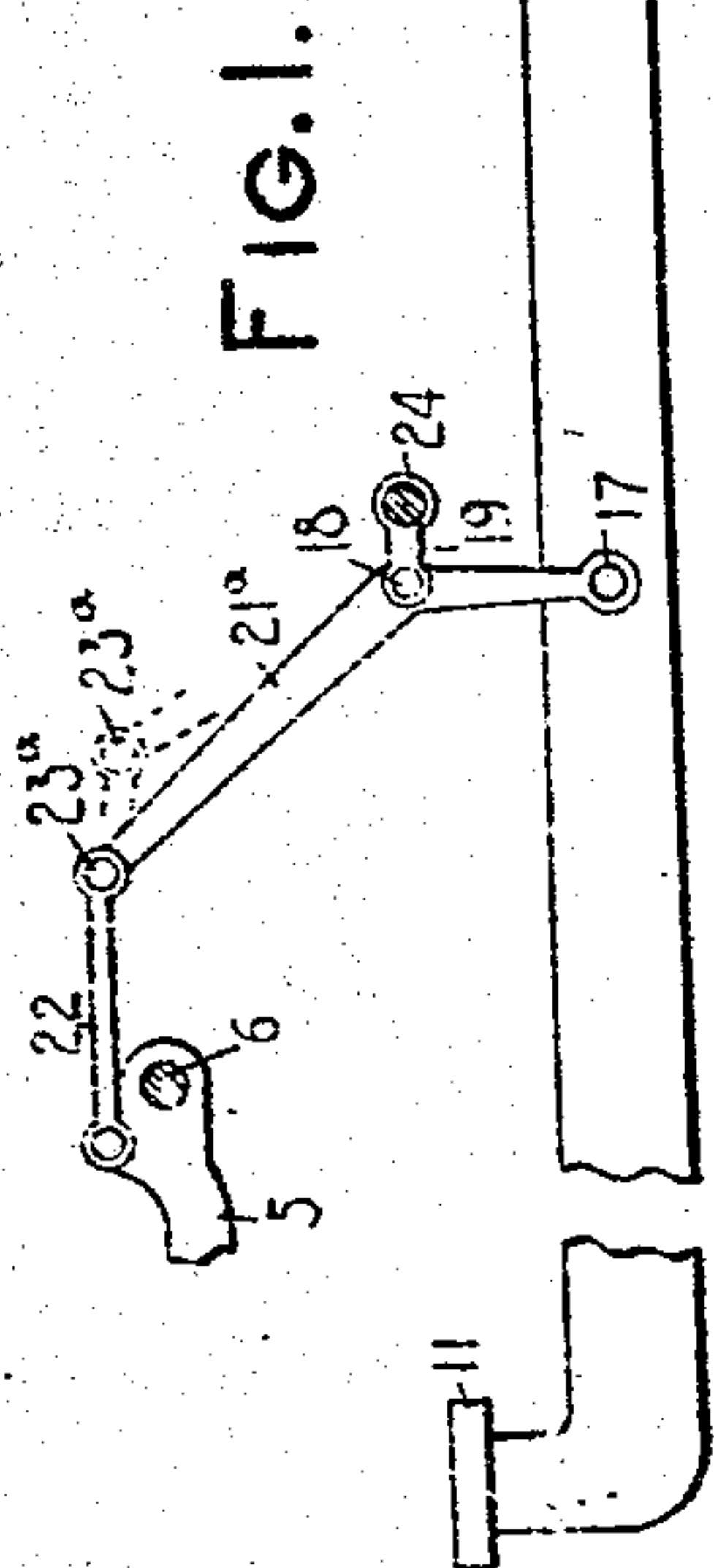


FIG. 1.

WITNESSES:

K. V. Donovan
E. M. Wells

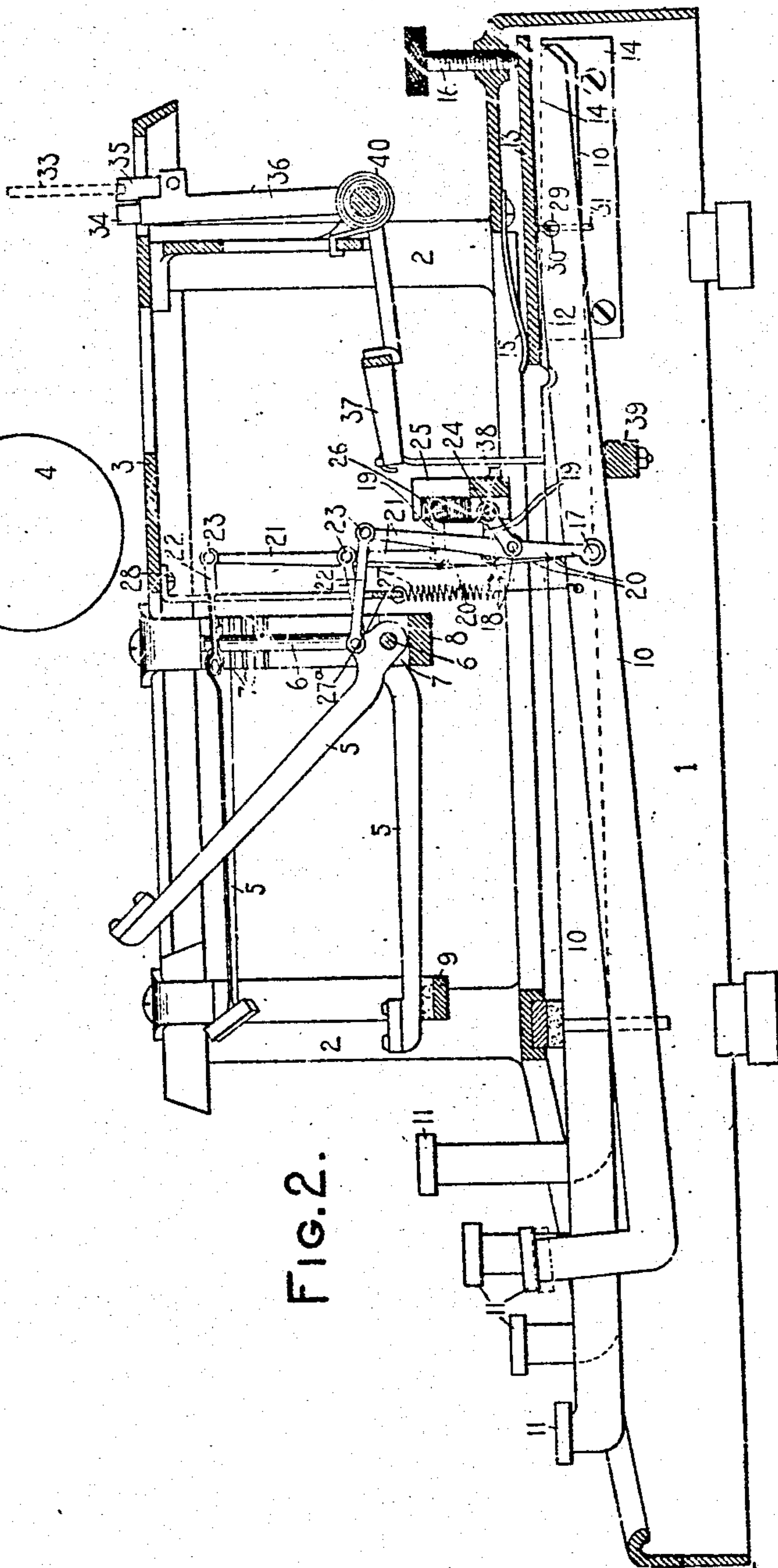


FIG. 2.

INVENTOR

Burham C. Stickney

by Jacob Feller

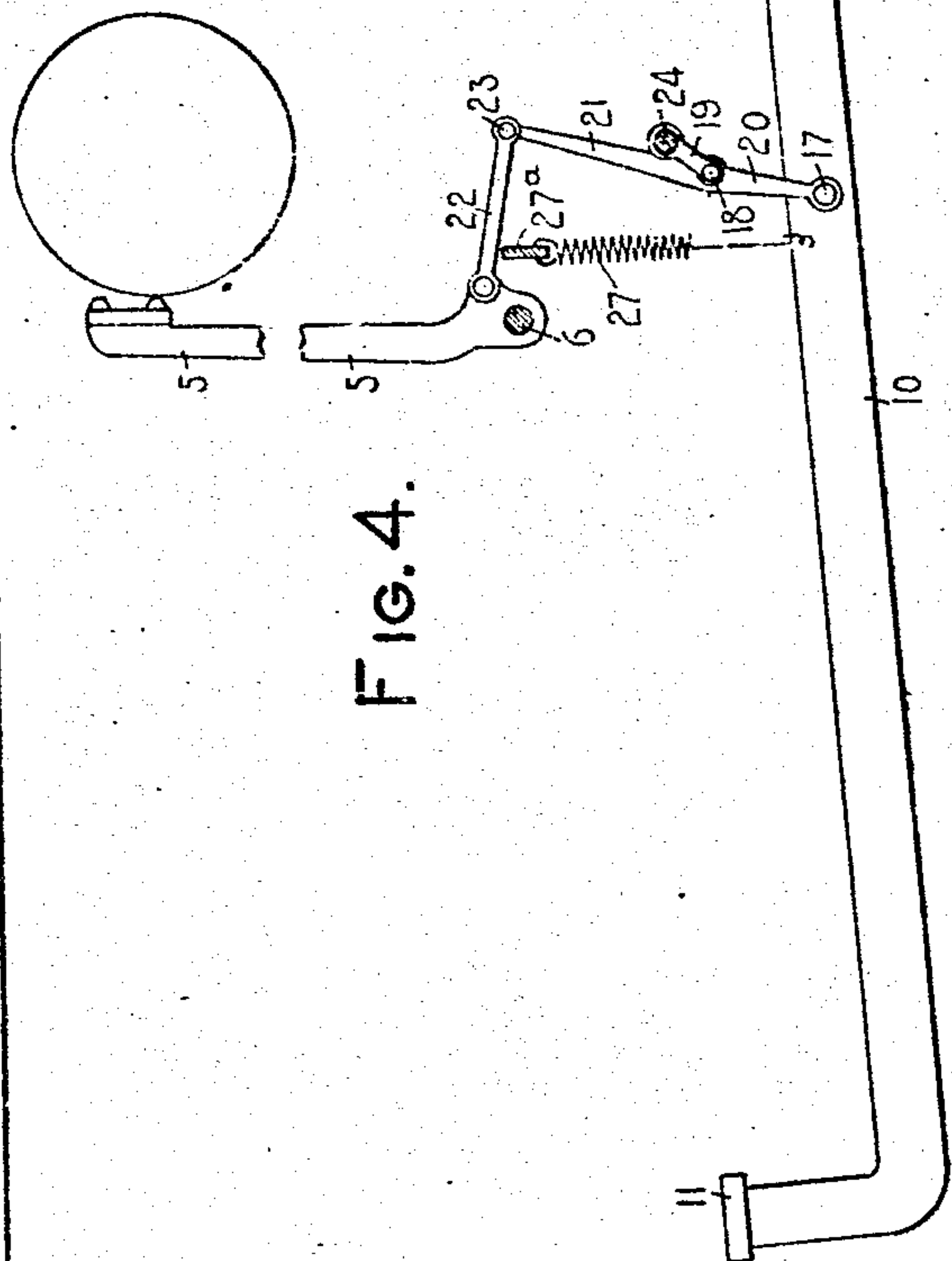
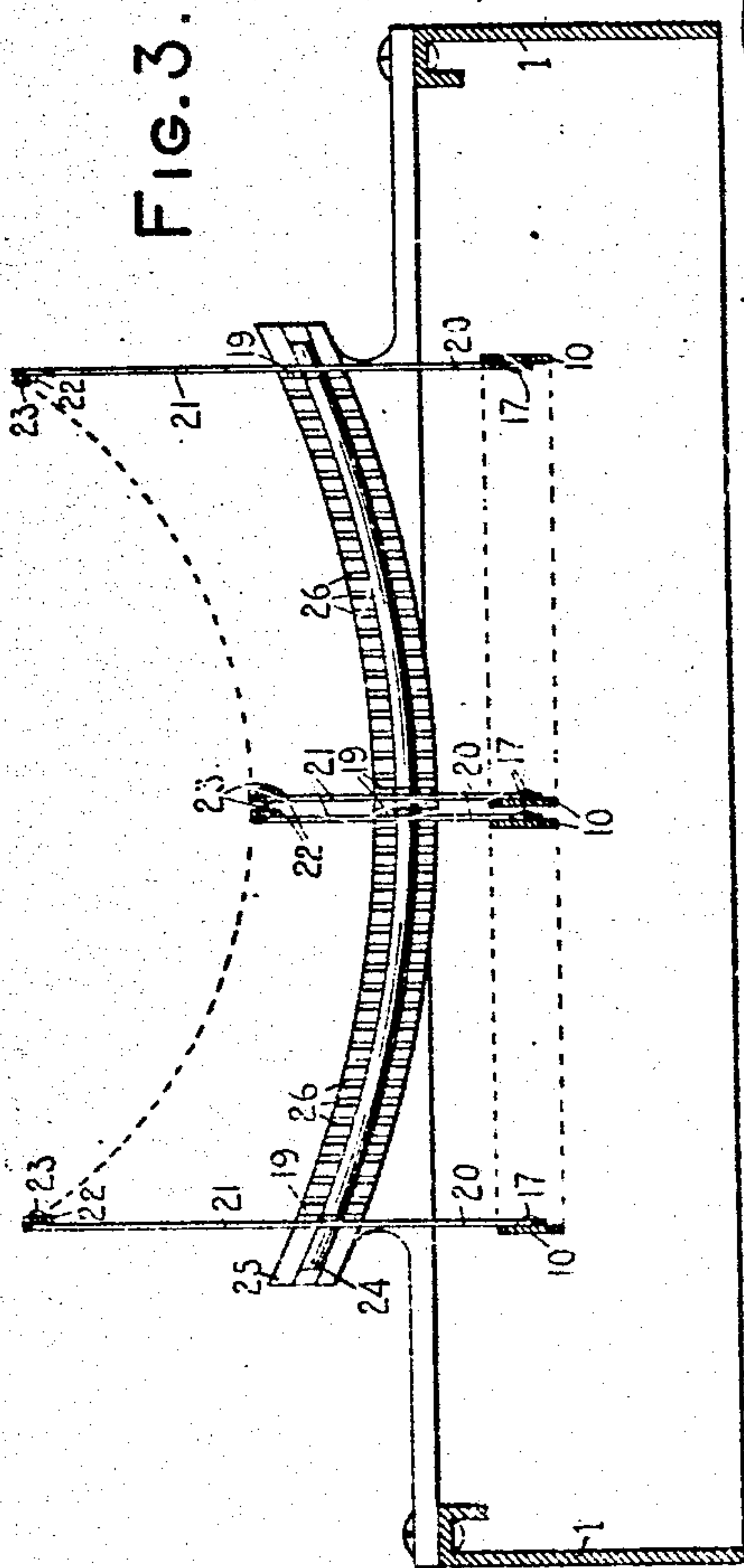
HIS ATTORNEY

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UNITED STATES PATENT OFFICE.

BURNHAM C. STICKNEY, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO UNION TYPE-WRITER COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TYPE-WRITING MACHINE.

974,841.

Specification of Letters Patent.

Patented Nov. 8, 1910.

Application filed April 9, 1903. Serial No. 151,845.

To all whom it may concern:

Be it known that I, BURNHAM C. STICKNEY, a citizen of the United States, and resident of Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to typewriting machines, especially those of the front-strike class; and its objects are to provide means for locking the types in normal position, to improve the key touch, to enable the leverage of the keys upon the type-bars to be varied at will without at any adjustment rendering the key touch unduly harsh, and otherwise to improve the type-actions in construction and operation.

My invention consists in certain features of construction and combinations of devices, which will hereinafter be fully set forth and particularly pointed out in the concluding claims.

In the drawings forming part of this specification, Figure 1 is a view of one form of type-action made in accordance with my invention; Fig. 2 is a longitudinal vertical section of a front strike writing machine made in accordance with my invention; one type-action being shown in normal position, and another when the type-bar is about half-way between normal position and printing position. Fig. 3 is a cross section taken just forward of the sub-lever system. Fig. 4 is a view of a type-action in printing position.

In the several views, like signs denote like parts.

The machine frame is of the usual type, comprising a base 1, corner posts 2 and a top-plate 3; and over the latter runs the usual carriage, of which is shown the platen 4. Type-bars 5, which strike rearwardly against the platen, are pivoted at their rear ends upon a curved fulcrum rod 6, are mounted at their rear ends in radial slots 7 cut in a segment 8, and rest at their forward ends upon a curved pad 9.

Horizontal levers 10, bearing at their forward ends keys 11, extend forwardly beneath the type-bars, and at their rear ends are provided with extended curved treads 12, which have a rocker motion upon an extended horizontal plate or fulcrum mem-

ber 13. The latter is made adjustable so as to vary the dip of the key-levers and alter their purchase upon the type-bars to which they are connected; and for this purpose the plate is supported at its ends upon ribs 14 curved to coincide with the lever treads, and is pressed down upon said ribs by a spring 15, and may be rocked along said ribs by means of a thumb screw 16. When the parts are in the position shown at Fig. 2, the purchase of the key-levers and their dip are greatest; and when the thumb screw is operated to press down the rear portion of the fulcrum-plate as far as it will go, the purchase of said levers upon the type-bars is least and the dip of the key is shortest.

To the key-levers 10, about midway of their ends, I pivot at 17 the lower ends of a series of upstanding sub-levers of the first order, which are pivoted between their ends at 18 to the forward ends of a series of short fulcrum links, 19, the lower arms 20 of the sub-levers being preferably shorter than the upper arms 21 thereof, and the latter being connected at their upper ends by forwardly extending links 22 to the type-bars, the points of attachment of said links 22, to the sub-levers being indicated at 23. The fulcrum links 19 extend rearwardly from the sub-levers and are pivoted at their rear ends upon a transverse rod 24, which is mounted upon a bar 25, the latter being slotted at 26 to receive the links. It will be noted that the sub-levers, which preferably stand in rear of the type-bars, are pivoted in line at their lower ends, while their upper ends grow progressively higher from the middle to the sides of the system, to agree with the increasing elevations at which the type-bars are mounted; and accordingly the fulcrum points 18 of the sub-levers are progressively raised to compensate for such increased lengths of the sub-levers; and as this renders it necessary to mount the fulcrum links 19 at gradually increasing elevations, the pivot rod 24 and its bar 25 are curved accordingly, as seen at Fig. 3. The links 19 thus lie in a curved row which ascends from the middle to the sides of the system.

Upon the depression of a key, the lever 10 is vibrated downwardly, its tread 12 rocking along the fulcrum plate 13. By the downward movement of said lever the sub-

lever 20, 21 is pulled bodily down in the general direction of its length, thereby vibrating the fulcrum link 19. The latter is mounted to swing downwardly and rearwardly, and thereby causes the sub-lever to vibrate rearwardly about its point of connection 17 to the key-lever; and through the link 22 the type-bar is pulled up to print. Upon the relief of the key from pressure, the parts are returned to normal position by a draw-spring 27. A set of these springs is hung in rear of the type-bars upon a straight transverse bar 27^a bent up at its ends and secured by screws 28 to the top-plate; the lower ends of said springs being caught in the key-levers in proximity to the load points 17 thereof, and forwardly of said load points.

It will be seen that the link 19 stands normally at about a right angle to the sub-lever 20, 21, and particularly to the lower arm 20 thereof which is pivoted to the key-lever; that this arrangement affords a dead centering of the parts and that because of this relation, said link, sub-lever and key-lever are enabled to cooperate not only to connect the key 11 to the type-bar, but also to lock the latter in normal position. It will be understood that it is impossible, when the parts are in normal position, to actuate the sub-lever by means of the type-bar link 22, since a rearward thrust upon said link tends merely to swing the lower end of the sub-lever forward and its fulcrum portion backward, that is, in directions longitudinal of the key-lever 10 and the fulcrum link 19 respectively; and since these members are on dead centers and cannot move longitudinally, no motion thereof can be produced by a thrust upon the link 22; and hence the type-bars, being unable to move the sub-levers and keys, remain locked in normal position so that rebound of the type-bars from the basket is impossible, and the machine may be operated at high speed without clashing of the type-bars. It will also be understood that since the point 18 at first moves downwardly, there is comparatively little vibration of the sub-lever 20, 21, and hence but little motion of the type-bar, so that the latter is started in motion gradually, thus improving the key touch. At Fig. 2 it will be seen that the key 11 nearly completes its stroke (the printing position of the key being indicated in dotted lines) by the time the type-bar is half way to the platen. During the latter part of the stroke, the link 19 vibrates rearwardly, and accelerates the vibration of the sub-lever, thereby speeding the type-bar as it approaches the platen, and enabling a powerful blow to be delivered thereon.

It will be seen that the adjustment of the pressure of the keys upon the type-bars effected by the thumb-screw 16, is wholly in-

dependent of the locking-link 19 and the sub-lever 20, 21; so that the advantages above set forth are substantially preserved even when the dip of the key is least.

It will be observed that the sub-levers float upon the two independently mounted movable supports 10 and 19 and for this reason the sub-levers in some instances are termed floating sub-levers; that each of the members 10 and 19 extends crosswise of the sub-lever; that the sub-lever arm 20 which is pivoted to the key-lever extends in the direction of movement of the latter; that the key-lever guides the lower end of the sub-lever, the key-lever itself being prevented from endwise displacement by means of a notch 29 therein, which engages a rib 30 provided upon the underside of the fulcrum plate 13, said rib being provided with lever-guiding teeth 31; that the pivotal point 18 first moves substantially in the direction of movement of the key-lever 10 and then transversely to said direction, so as to vibrate the sub-lever, and that the link 19 is so proportioned and mounted that said vibratory movement is accelerated throughout the printing stroke. At Fig. 4 it will be observed that the link 19 is nearly longitudinal of the sub-lever.

The preferred form of sub-lever is illustrated at Fig. 1, in which the upstanding arm 21^a of the lever is inclined forwardly from its point of connection 18 with the fulcrum link 19, thereby to cause the upper end of the lever at 23^a to move rearwardly in a nearly horizontal line, thus avoiding an undue sinking movement of the rear ends of the links 22. At this figure the key-lever 10^a is illustrated as pivoted upon a simple fulcrum rod 32 of usual type.

The movements of the paper-carriage may be controlled by the usual escapement wheel 33 and feeding dogs 34 and 35, mounted upon a rocker 36, the latter having arms 37, from which depend links 38 which suspend a universal bar 39 beneath the key-levers 10; said rocker being also provided with the usual returning spring 40.

Variations may be resorted to within the scope of my invention, and portions of my improvements may be used without others.

It will be understood that the key-levers may converge in rear of the keyboard, to conform to the width of the system of sub-levers pivoted thereto.

What I claim as new and desire to secure by Letters Patent, is:—

1. In a typewriting machine, the combination of a series of type bars; a series of key operated levers; a series of sub-levers pivoted to the key operated levers; fulcrum links to which said sub-levers are pivoted; and means for enabling said sub-levers to operate said type bars, said type bars, fulcrum links and key operated levers being

connected to said sub-levers at different points lengthwise of the latter, and the disposition of the parts being such that there is a dead centering of the parts to lock the type bars against rebound from their normal position.

2. In a typewriting machine; the combination of a series of key operated levers; a series of floating sub-levers pivoted to the key operated levers; a series of type bars connected to said sub-levers; and a series of movable devices connected to said sub-levers and to the framework of the machine, said movable devices, type bars and key operated levers being connected with said sub-levers at different points lengthwise of the latter, and the disposition of the parts being such that there is a dead centering of the parts that locks the type bars against rebound from their normal position.

3. In a typewriting machine, the combination of a series of type bars; a series of key operated levers; a series of sub-levers pivoted to the key operated levers; fulcrum links to which said sub-levers are pivoted; and actuating links connecting said sub-levers to the type bars, said actuating links, fulcrum links and key operated levers being connected with said sub-levers at different points lengthwise of the latter, and the disposition of the parts being such that there is a dead centering of the parts that locks the type bars against rebound from their normal position.

4. In a typewriting machine, the combination of a series of type-bars, a series of key-operated levers, a series of sub-levers pivoted at one set of their ends to the key-operated levers, fulcrum links to which said sub-levers are pivoted, and links connecting the other set of sub-lever ends to said type-bars.

5. In a front strike writing machine, the combination of a series of rearwardly striking type-bars, a series of key-bearing levers, a series of sub-levers pivoted upon the key-bearing levers and having upstanding arms which are connected to the type-bars, and a series of fulcrum links upon which said sub-levers are also pivoted, the disposition of the parts being such that there is a dead centering of the parts that lock the type bar in its normal position.

6. In a front strike writing machine, the combination of a series of rearwardly striking type-bars, a series of key-bearing levers, a series of sub-levers whose lower ends are pivoted to the key-bearing levers, links connecting the upper ends of said levers directly to the type-bars, and fulcrum links upon which are pivoted said sub-levers between the ends of the latter.

7. In a front strike writing machine, the combination of a series of rearwardly striking type-bars, a series of key-bearing levers

extending forwardly beneath the type-bars, a series of sub-levers upstanding in rear of the type-bars and pivoted at their lower ends upon said key-bearing levers; fulcrum links to which said sub-levers are pivoted, and forwardly extending links connecting the upper ends of said sub-levers to said type-bars.

8. In a front strike writing machine, the combination of a series of rearwardly striking type-bars, a series of key-bearing levers extending forwardly beneath the type-bars, a series of sub-levers upstanding in rear of the type-bars and pivoted at their lower ends upon said key-bearing levers, fulcrum links to which said sub-levers are pivoted, said fulcrum links extending rearwardly and being pivoted at their rear ends upon a fixed support, and forwardly extending links connecting the upper ends of said sub-levers to said type-bars.

9. In a front strike writing machine, the combination of a series of rearwardly striking type-bars, a series of key-bearing levers extending forwardly beneath the type-bars, a series of sub-levers upstanding in rear of the type-bars and pivoted at their lower ends to said key-bearing levers, and fulcrum links to which said sub-levers are pivoted; said sub-levers being connected at their upper ends to said type-bars, and also being shortest at the middle of the system and of progressively increasing lengths from the middle to the sides of the system.

10. In a front strike writing machine, the combination of a series of rearwardly striking type-bars, a series of key-bearing levers extending forwardly beneath the type-bars, a series of sub-levers upstanding in rear of the type-bars and pivoted at their lower ends upon said key-bearing levers, and fulcrum links to which said sub-levers are pivoted; said sub-levers being connected at their upper ends to said type-bars, and also being shortest at the middle of the system and of progressively increasing lengths from the middle to the sides of the system, and the series of fulcrum links being pivoted in a curve which ascends from the middle to the sides of the system.

11. In a typewriting machine, the combination of a type-bar, a sub-lever, two independently mounted movable members upon which said sub-lever is pivoted at different points lengthwise of said sub-lever, one of said independently mounted members being a fulcrum for said sub-lever, a key connected to the other of said independently mounted members, and means for connecting said sub-lever at one end to said type-bar, the parts attaining a dead center position when in the normal position which prevents a rebound of the type bar from the normal position.

12. In a typewriting machine, the combi-

- nation of a type-bar, a sub-lever, two independently mounted parallel movable members upon which said sub-lever is pivoted at different points lengthwise of said sub-lever.
- 5 one of said independently mounted members being a fulcrum for said sub-lever, a key connected to the other of said independently mounted members, and means for connecting said sub-lever at one end to said
- 10 type bar; each of said independently mounted members extending crosswise of said sub-lever, to afford a dead centering which prevents a rebound of the type bar from the normal position.
13. In a typewriting machine, the combination of a type-bar, a key-operated lever, a sub-lever pivoted to said key-operated lever and connected to said type-bar, and a fulcrum link upon which said sub-lever is pivoted; the sub-lever arm which is pivoted to
- 20 said key-operated lever extending in the direction of movement of the latter, and said fulcrum link being so mounted as to cause the sub-lever to vibrate when actuated by the key-operated lever, and to prevent a rebound of the type bar from the normal position.
14. In a typewriting machine, the combination of a type bar, a key-lever, a sub-lever
- 30 connected to said type-bar and pivoted upon said key-lever so as to be given a longitudinal movement thereby at the initial portion of the key stroke, and a fulcrum link to which said sub-lever is pivoted and through which fulcrum link and its pivotal connection with the sub-lever said sub-lever is given a vibratory movement when actuated by the key-lever, the sub-lever and link being dead centered when the parts are in
- 35 normal position to prevent a rebound of the type bar from the normal position.
15. In a typewriting machine, the combination with a type-bar, of a lever connected thereto, a fulcrum link upon which said
- 45 lever is pivoted between its ends, and means for moving said lever longitudinally and guiding the same.
16. In a front strike writing machine, the combination with a rearwardly striking
- 50 type-bar, of an upstanding lever, a link connecting the upper end of said lever to said type-bar, a fulcrum link to which said lever is pivoted between its ends, and means for actuating said lever in a downward direction and guiding its lower end.
17. In a typewriting machine, the combination of a type-bar, a lever, means for connecting one end of said lever to said type-bar, a fulcrum link to which said lever is
- 60 pivoted between its ends, and means for moving said lever bodily lengthwise and guiding its opposite end.
18. In a typewriting machine, the combination of a type-bar, a lever, means for connecting one end of said lever to said type-
- bar, a fulcrum link to which said lever is pivoted between its ends, and an operating member to which the opposite end of said lever is pivoted; said link normally standing crosswise of said lever, and being proportioned and mounted to vibrate said lever upon said operating member.
19. In a typewriting machine, the combination of a type-bar, a lever, means for connecting one end of said lever to said type-bar, a fulcrum link to which said lever is pivoted between its ends, and an operating member to which the opposite end of said lever is pivoted; said link normally standing crosswise of said lever, the construction and arrangement of the parts being such that the pivotal point of connection between said link and said lever first moves substantially in the direction of movement of said operating member and then transversely to said
- 25 direction, so as to vibrate said lever.
20. In a typewriting machine, the combination of a type-bar, a lever, means for connecting one end of said lever to said type-bar, a fulcrum link to which said lever is pivoted between its ends, and an operating member to which the opposite end of said lever is pivoted and which effects a longitudinal pull on said lever; said link normally standing crosswise of said lever, the construction and arrangement of the parts being such that the pivotal point of connection between said fulcrum link and said lever first moves substantially in the direction of movement of said operating member and then transversely to said direction so as to vibrate said lever, and so that the vibratory movement of said lever is accelerated throughout the printing stroke.
21. In a front strike writing machine, the combination of a series of rearwardly striking type-bars, a series of key-bearing levers, a series of sub-levers whose lower ends are pivoted to the key-bearing levers, links connecting the upper ends of said levers directly to the type-bars, and fulcrum links upon which are pivoted said sub-levers between the ends of the latter; said fulcrum links extending about at right angles to said sub-levers, and being mounted to swing in a manner to cause the latter to vibrate upon said key-levers.
22. In a front strike writing machine, the combination of a series of rearwardly striking type-bars, a series of key-bearing levers extending forwardly beneath the type-bars; a series of sub-levers upstanding in rear of the type-bars and pivoted at their lower ends upon said key-bearing levers, fulcrum links to which said sub-levers are pivoted, said fulcrum links extending rearwardly and being pivoted at their rear ends upon a fixed support, and forwardly extending links connecting the upper ends of said sub-levers to said type-bars; said fulcrum links

extending about at right angles to said sub-levers, and being so pivoted and of such length as to vibrate the latter rearwardly at constantly accelerated speed when operated by said key-bearing levers.

23. In a typewriting machine, the combination of a type-bar, a key-operated lever, a sub-lever pivoted to said key-operated lever and connected to said type-bar, and a fulcrum link to which said sub-lever is also pivoted; said key lever, sub-lever and fulcrum link being dead centered in the normal positions thereof to resist rebound of the type bar so as to lock said type-bar in normal position.

24. In a typewriting machine, the combination of a type-bar, a key-operated lever, a sub-lever pivoted at one end to said key-operated lever and connected to said type-bar, and a fulcrum link to which said sub-lever is also pivoted between its ends; said key-lever, sub-lever and fulcrum link being so related as to lock said type-bar in normal position.

25. In a typewriting machine, the combination of a series of type-bars, a series of key-operated levers, a series of sub-levers pivoted to the key-operated levers, fulcrum links to which said sub-levers are pivoted, and means for enabling said sub-levers to operate the type-bars; said sub-levers and fulcrum links being dead centered in the normal positions thereof to resist rebound of the type bar so as to lock said type-bars in normal position.

26. In a front strike writing machine, the combination of a series of rearwardly striking type-bars, a series of key-bearing levers, a series of sub-levers pivoted upon the key-bearing levers and having upstanding arms which are connected to the type-bars, and a series of fulcrum links upon which said sub-levers are also pivoted; said key-operated levers, sub-levers and fulcrum links being dead centered in the normal positions thereof to resist rebound of the type bar so as to lock said type-bars in normal position.

27. In a front strike writing machine, the combination of a series of rearwardly striking type-bars, a series of key-bearing levers extending forwardly beneath the type-bars, a series of sub-levers upstanding in rear of the type-bars and pivoted at their lower ends upon said key bearing levers, fulcrum links to which said sub-levers are pivoted, said fulcrum links extending rearwardly and being pivoted at their rear ends upon a fixed support, and forwardly extending links connecting the upper ends of said sub-levers to said type-bars; said fulcrum links cooperating with said key-levers to lock said type-bars in normal position.

28. In a typewriting machine, the combination of a type-bar, a sub-lever, two inde-

pendently mounted movable members upon which said sub-lever is pivoted at different points lengthwise of said sub-lever, one of said independently mounted members forming a fulcrum for said sub-lever, a key connected to the other of said independently mounted members, and means for connecting said sub-lever at one end to said type-bar; said sub-lever being so related to said two independently mounted members as to dead center when in its normal position to resist rebound of the type bar and thus lock said type-bars in normal position.

29. In a typewriting machine, the combination of a type-bar, a key-operated lever, a sub-lever pivoted to said key-operated lever and connected to said type-bar, and a fulcrum link upon which said sub-lever is pivoted; the sub-lever arm which is pivoted to said key-lever extending substantially in the direction of movement of the latter, and said fulcrum link being so mounted crosswise of said sub-lever as to cause the sub-lever to vibrate when actuated by the key-lever, and said key-lever, sub-lever and fulcrum link dead centering when in their normal positions to lock said type-bar in normal position.

30. In a front strike writing machine, the combination of a series of rearwardly striking type-bars, a series of key-bearing levers extending forwardly beneath the type-bars, a series of sub-levers upstanding in rear of the type-bars and pivoted at their lower ends upon said key-bearing levers, fulcrum links to which said sub-levers are pivoted, said fulcrum links extending rearwardly and being pivoted at their rear ends upon a fixed support, and forwardly extending links connecting the upper ends of said sub-levers to said type-bars; the upper arms of said sub-levers being inclined forwardly from their points of connection with said fulcrum links.

31. In a typewriting machine, the combination of a type bar; a key-operated lever, said lever having an extended tread; an extended fulcrum member along which said tread has a rocking motion; means for effecting a relative adjustment of said tread and said fulcrum member so as to vary the purchase of said lever upon the type bar; and actuating means between said key-operated lever and said type bar for causing the purchase of said key-operated lever upon the type-bar to decrease materially during the printing stroke, said actuating means including a link normally dead centered against movement by the type bar and thus locks the type bar in normal position.

32. In a typewriting machine, the combination of a type-bar, a key-operated lever, said lever having an extended tread, an extended fulcrum member along which said tread has a rocking motion, means for ef-

fecting a relative adjustment of said tread and said fulcrum member so as to vary the purchase of said lever upon the type-bar, and means, including a link which is normally maintained in dead centered position against movement by the type bar and thus locks the type-bar in normal position, and a sub-lever pivoted to said key-lever and fulcrumed upon said link, for connecting
10 said lever to said type-bar and causing the purchase of said key-operated lever upon

the type-bar to decrease materially during the printing stroke.

Signed at the borough of Manhattan, city of New York, in the county of New York, 15 and State of New York, this 7th day of April A. D. 1903.

BURNHAM C. STICKNEY.

Witnesses:

K. V. DONOVAN,
E. M. WELLS.